CLAIMS

What is claimed is:

1. A convergence system for translating data received in an ATM format into a MAC format, the convergence system comprising:

a network connection provisioning module configured to grant or reject requests for a communication channel connection, which upon granting a connection selects a compression method, from a plurality of selectable compression methods, at least some of which include mapping ATM cell addressing bits into MAC packet addressing fields;

an ATM segmentation module configured to buffer data which is incoming on the granted connection and to provide portions of the data to other modules, the portions provided depending upon the selected compression method;

a MAC header module configured to derive a header for a MAC packet from data in one or more incoming ATM cells having a common destination in combination with connection parameters including any selected header compression methods; and

a MAC reassembly module configured to format data from the ATM segmentation module and the MAC header module into an outgoing MAC data packet having a header and a payload which represents incoming data from one or more ATM cells sharing a common destination.

2. The convergence system of claim 1 wherein for at least one of the selectable compression methods the MAC reassembly module is further configured to include payload data of a plurality of ATM cells sharing a common destination in the payload of the outgoing MAC data packet and to remove any ATM header addressing data therefrom.

3. The convergence system of claim 1 wherein for at least one of the selectable compression methods the MAC reassembly module is further configured to include payload data of a plurality of ATM cells sharing a common destination in the payload of the outgoing MAC data packet and to remove all ATM header data therefrom.

4. The convergence system of claim 1 wherein for at least one of the selectable compression methods the MAC reassembly module is further configured to include payload data of a plurality of ATM cells sharing a common destination, and to encapsulate a fraction of ATM header addressing data from each of the plurality of ATM cells in the payload of the outgoing MAC data packet.

5. The convergence system of claim 4 wherein for at least one of the selectable compression methods the MAC reassembly moduleis further configured to include payload data of a plurality of ATM cells sharing a common destination and to encapsulate a virtual connection identifier from the header of each of the plurality of ATM cells along with the ATM payload data.

6. The convergence system of claim 1 wherein for at least one of the selectable compression methods the ATM segmentation module is further configured to remove padding from an ATM trailer cell payload, and subsequently to provide payload data from the trailer cell to the MAC reassembly module.

7. The convergence system of claim 1 wherein for at least one of the selectable compression methods the ATM segmentation module removes padding and also CPCS and SSCS bytes from an ATM trailer cell payload prior to providing payload data from the trailer cell to the MAC reassembly module.

8. The convergence system of claim 1 wherein for at least one of the selectable compression methods the ATM segmentation module removes padding from an ATM trailer cell payload and adding a padding pattern byte representative of a pattern of the padding removed prior to providing payload data from the trailer cell to the MAC reassembly module.

9. A method for compressing and converting data packets initially in a first fixed-length packet format which are being converted to a second packet format prior to transmission through a link, the initial data packets each including a header containing overhead data added by a communication system, the method comprising the steps of:

obtaining a plurality of incoming packets formatted in the first fixed-length format and having common header addressing data;

preparing a second-format packet to convey payload data from the plurality of incoming packets by

mapping the common addressing data into a header of the second-format packet,

entering payload data from the plurality of incoming packets into a payload section of the second-format packet, and

omitting the common addressing data from the payload of the second-format packet.

10. The method for compressing and converting data packets of claim 9 wherein the common addressing data includes all of the first-format header addressing data.

11. The method for compressing and converting data packets of claim 9 wherein the entire first-format header is mapped into the second-format header, and the entire first-format header is omitted from the second-format payload.

12. The method for compressing and converting data packets of claim 9 wherein a fraction of the first-format header addressing data of the incoming first-format packets is not common, and that fraction from each incoming packet is encapsulated with payload data from the incoming packet to form part of a payload of the second-format packets.

13. The method for compressing and converting data packets of claim 12 wherein the first-format packets are ATM cells, the second-format packets are MAC packets, and the fraction of each ATM cell header which is encapsulated with payload data from the ATM cell is a virtual connection identifier.

14. The method for compressing and converting data packets of claim 9 wherein a fraction of the first-format header addressing data of the incoming first-format packets which is common is disposed one place within the second-format packet.

15. The method for compressing and converting data packets of claim 14 wherein the first-format packets are ATM cells and the second-format packets are MAC packets.

16. The method for compressing and converting data packets of claim 9 including a further step of removing padding data from a trailer packet of the plurality of first-format packets.

17. The method for compressing and converting data packets of claim 16 wherein the first-format packets are ATM cells, the second-format packets are MAC packets, the trailer packet is an ATM trailer cell containing an end-of-message indication, and including the further step of removing CPCS and SSCS bytes from the ATM trailer cell.

18. A method for compressing data packets which are initially in a first fixed-length packet format and are being converted to a second packet format prior to transmission through a link, the initial data packets each including user data intended for an end user and a header containing overhead data added by a communication system which is not intended for delivery to an end user, the method comprising the steps of:

obtaining one or more incoming packets formatted in the first fixed-length format, each of the incoming packets having identical headers;

preparing a second-format packet to convey data from the one or more incoming packets by

(a) mapping first-format header overhead data into a header of the second-format packet;

(b) representing all user data from the one or more first-format packets in a payload of the second-format packet; and

(c) omitting from the second-format payload all first-format header data mapped into the second-format packet header of the first-format header.

19. The method for compressing data packets of claim 18 including the further steps of

obtaining a first-format trailer data packet having a header identical to the headers of the one or more incoming packets except for a field indicating that the trailer packet is a last packet of a block of packets having a common destination, the trailer packet including a payload having user data and overhead padding bytes;

including the user data from the trailer packet payload with payload data from the one or more first-format packets in the second-format payload, and

omitting at least some of the padding bytes from the second-format payload.

20. The method for compressing data packets of claim 19 wherein the second-format data packets are MAC packets, the first-format data packets are ATM cells, and the trailer packet is an ATM trailer cell which includes CPCS and SSCS bytes; and wherein

all padding cells are omitted from the MAC packet, and

the CPCS and SSCS bytes from the ATM trailer cell are omitted from the MAC packet.

21. An apparatus for communicating data between a plurality of users and a network, the apparatus comprising one or more base stations, each base station including

a network connection accepting incoming data in packets from a wide area network in a first packet format;

a translation controller which reduces data from headers or from trailers of the incoming packets in a process of translating the incoming data into a second packet format, the second packet format being a variable length format;

a transmission unit having a plurality of directional antennas, each antenna sending and receiving radiofrequency communications with a plurality of associated users within a directional sector served by the antenna, each user having customer premise equipment complementary to the transmission unit;

a transmission controller for directing transmission of data signals to each user; and

data receiving apparatus associated with each user, the data receiving apparatus:

receiving the transmitted data signals,

decoding the received data signals into received data having the second packet format,

reconstructing the received data into the first packet format, and

checking the reconstructed data for errors.

22. A method for compressing composite data formatted in ATM cells prior to transmission over a broadband wireless link, the composite data including user data intended for communication to an end user and overhead data not intended for communication to the end user, the method comprising the steps of:

obtaining incoming composite data in a plurality of ATM cells having a common destination;

removing ATM cell header overhead data common to the plurality of ATM cells to form header-reduced cell data;

identifying padding bytes added to an ATM trailer cell which are overhead data;

removing the padding bytes from the ATM trailer cell;

adding an indication of the number of data bytes retained from the ATM trailer cell;

concatenating representations of header-reduced cell data from each of the plurality of ATM cells and a representation of the retained trailer cell data bytes to form a payload of a variable-length transmission packet.

23. A method for compressing data packets which are initially in a first fixed-length packet format and are being converted to a second packet format prior to transmission through a link, the initial data packets each including a header containing overhead data added by a communication system, the method comprising the steps of:

determining, during setup of a particular packet block transfer, whether virtual path or virtual connection switching is required for the particular packet block transfer;

obtaining a plurality of incoming packets formatted in the first fixed-length format, each of the incoming packets having identical headers and constituting at least part of the particular packet block transfer;

preparing a second-format packet to convey data from the plurality of incoming packets by selecting, dependent upon the type of switching required as established during block transfer setup, either

(a) mapping all header data from one of the first-format packet headers into the second-format header, adding data reflective of all user data in the first-format packets to a payload of the second-format packet, and omitting all first-format header data from the payload of the second-format packet, or

(b) mapping a portion of header data from one of the first-format packet headers into the second-format header, omitting the mapped portion of header data from other parts of the second-format packet, and placing data reflecting remaining first-format header data along with payload data from each of the incoming packets into a payload section of the second-format header.